

Application No. 09/890,441
Response to Office Action

Customer No. 01933

Listing of Claims:

1. (Currently Amended) A wander generator comprising:

random number generating means for sequentially generating a
random number ~~signal comprised of~~ signals comprising a plurality
of bits at a constant rate in accordance with a predetermined
5 algorithm;

a filter unit ~~for receiving which receives~~ a sequence of ~~the~~
random number signals output from said random number generating
means ~~for performing to perform~~ filtering;

clock generating means for generating a clock signal;

10 modulating means for modulating ~~the~~ a frequency of the clock
signal generated by said clock ~~signal generator~~ generating
means by a signal output from said filter unit; and

setting means for setting each amplitude value for a
spectrum of a signal sequence output from said filter unit such
15 that ~~the~~ a characteristic of wander of the clock signal having
the frequency modulated by said modulating means matches a
desired characteristic.

2. (Currently Amended) A wander generator according to
claim 1, ~~characterized in that wherein~~ said random ~~number signal~~
generating means ~~has~~ comprises a plurality of pseudo random
signal ~~generator, wherein said plurality of pseudo random signal~~

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- 5 generators which combine pseudo random signals generated thereby respectively, and said random number generating means is configured to sequentially generate random number signals ~~comprised of~~ comprising the plurality of bits at a constant speed.

3. (Currently Amended) A wander generator according to claim 1, ~~characterized in that~~ wherein said filter unit ~~includes~~ comprises:

- 5 a plurality of storage elements for storing an input signal sequence while sequentially shifting ~~it~~ the input signal sequence; and

calculating means for performing a product sum calculation of stored values stored in said plurality of storage elements with a plurality of coefficients.

4. (Currently Amended) A wander generator according to claim 3, ~~characterized in that~~ wherein said filter unit is configured to store ~~a~~ the random number signal sequence output from said random number generating means in said plurality of storage elements, to perform the product sum calculation ~~by means~~ of with said calculating means, and to filter the random number signal sequence, and
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10 wherein said setting means sets the plurality of
coefficients in said calculating means as signals for setting
respective amplitude values for spectra of the signal sequence
output from said filter unit.

5. (Currently Amended) A wander generator according to
claim 3, ~~characterized in that~~ wherein said filter unit
comprises:

5 data distributing means for distributing the random number
signal sequence generated by said random number ~~signal~~ generating
means into a plurality of paths having different rates from each
other;

10 weighting means for weighting a signal sequence for each of
the paths distributed by said data distributing means with a
previously set coefficient for each of the paths; and

15 combining means for combining the signal sequences on the
respective paths weighted by said weighting means ~~by means of~~ via
a plurality of sub-band combiners ~~comprised of~~ comprising a
plurality of storage elements and the calculating means and for
outputting ~~the~~ a result of the combination as ~~the~~ a result of
filtering, and

wherein said setting means sets the plurality of weighting
coefficients in said weighting means of said filter unit as

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signals for setting respective amplitude values for spectra of
20 the signal sequence output from said filter unit.

6. (Currently Amended) A wander generator according to
claim 3, ~~characterized by~~ further comprising initial setting
means for initially setting values equivalent to stored values
stored in said respective storage elements in a steady state in
5 which the clock signal having the wander of the desired
characteristic is being output to said respective storage
elements included in the filter unit at least in an initial phase
of operation of said apparatus through a path different from a
signal input path in the steady state.

7. (Currently Amended) A wander generator according to
claim 1, ~~characterized by~~ further comprising:

characteristic calculating means for calculating ~~a~~
the characteristic of wander in ~~a~~ the clock signal
5 frequency-modulated by said modulating means based on information
including a signal set in said filter unit from said setting ~~unit~~
means; and

characteristic display means for displaying the
characteristic calculated by said characteristic calculating
10 means.

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Claim 8 (Canceled).

9. (Currently Amended) A wander generator for generating a clock signal having wander which satisfies a desired time deviation characteristic, ~~characterized by~~ comprising:

center frequency information setting means for setting data
5 for determining a center frequency of the clock signal;

characteristic information setting means for setting
characteristic information of the desired time deviation
characteristic;

a fluctuating signal sequence generator unit for generating
10 a fluctuating signal sequence having a power spectrum density
distribution characteristic of frequency fluctuations
corresponding to the desired time deviation characteristic based
on the characteristic information set by said characteristic
information setting means;

15 an adder for adding the data set by said center frequency
information setting means to the fluctuating signal sequence
output from said fluctuating signal sequence generator unit;

a direct digital synthesizer for outputting a frequency
signal corresponding to an output of said adder; and

20 a clock signal output circuit for waveform shaping an output
signal of said direct digital synthesizer to output a clock
signal;

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wherein said fluctuating signal sequence generator unit comprises:

25 noise generating means for generating a white noise signal based on a pseudo random signal;

impulse response processing means for calculating an impulse response of a transfer function for approximating a power spectrum of the white noise signal output from said noise
30 generating means to the power spectrum density distribution characteristic of the frequency fluctuations based on the characteristic information set by said characteristic information setting means; and

convolution processing means for convoluting a result of the
35 calculation by said impulse response processing means with the missourians white noise signal output from the noise generating means to generate the fluctuating signal sequence having the power spectrum density distribution characteristic of the frequency fluctuations.

Claim 10 (Canceled)

11. (Currently Amended) A wander generator according to the claim ~~10~~ 9, ~~characterized in that~~ wherein said impulse response processing means corrects ~~an~~ the impulse response with a correction function corresponding to an error between the power

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spectrum density distribution characteristic of the frequency fluctuations and the transfer function.

12. (Currently Amended) A wander generator according to claim ~~10~~ 9, ~~characterized in that~~ wherein said convolution processing means preferentially performs ~~the~~ a product sum calculation for smaller absolute values of the result of the calculation for the impulse response.

13. (Currently Amended) A wander generator according to claim ~~10~~ 9, ~~characterized in that~~ wherein said impulse response processing means is configured to perform the calculation for the impulse response each time a white noise signal is output from
5 the noise generating means; and

wherein said convolution processing means performs the convolution processing using the result of the calculation made each time by the impulse response processing means.

14. (Currently Amended) A wander generator ~~according to claim 9,~~ for generating a clock signal having wander which satisfies a desired time deviation characteristic, comprising:
center frequency information setting means for setting data
5 for determining a center frequency of the clock signal;

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characteristic information setting means for setting
characteristic information of the desired time deviation
characteristic;

10 a fluctuating signal sequence generator unit for generating
a fluctuating signal sequence having a power spectrum density
distribution characteristic of frequency fluctuations
corresponding to the desired time deviation characteristic based
on the characteristic information set by said characteristic
information setting means;

15 an adder for adding the data set by said center frequency
information setting means to the fluctuating signal sequence
output from said fluctuating signal sequence generator unit;

a direct digital synthesizer for outputting a frequency
signal corresponding to an output of said adder; and

20 a clock signal output circuit for waveform shaping an output
signal of said direct digital synthesizer to output a clock
signal;

~~characterized in that wherein~~ said fluctuating signal
sequence generator unit comprises:

25 noise generating means for generating a white noise signal
based on a pseudo random signal;

data distributing means for distributing noise signals
output from said noise generating means into respective signal
paths ~~respectively~~ in accordance with a plurality of bands into

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30 which a frequency range of ~~a~~ the power spectrum density
distribution characteristic of the frequency fluctuations is
divided to output at rates corresponding to the respective bands;

weighting means for applying weights in accordance with ~~the~~
a magnitude of spectrum of each of the bands into which the
35 frequency band of the power spectrum density distribution
characteristic is divided for the noise signals at the respective
rates distributed by said data distributing means; and

combining means for combining the noise signals at the
respective rates weighted by said weighting means to generate ~~a~~
40 the fluctuating signal sequence having the power spectrum density
distribution characteristic of the frequency fluctuations.

15. (Currently Amended) A wander generator according to
claim ~~10~~ 9, ~~characterized in that~~ wherein said noise generating
means ~~has~~ comprises a plurality (m) of sets of pseudo random
signal generating means for generating pseudo random codes of M
5 sequence at initial phases different from one another, and is
configured to collect outputs at predetermined stages of said
respective pseudo random signal generating means to output an
m-bit parallel white noise signal.

Claims 16-21 (Canceled).

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22. (Currently Amended) A wander generator according to claim 5, ~~characterized by~~ further comprising initial setting means for initially setting values equivalent to stored values stored in said respective storage elements in a steady state in which the clock signal having the wander of the desired characteristic is being output to said respective storage elements included in the filter unit at least in an initial phase of operation of said apparatus through a path different from a signal input path in the steady state.

23. (Currently Amended) A wander generator according to claim 14, ~~characterized in that~~ wherein said noise generating means ~~has~~ comprises a plurality (m) of sets of pseudo random signal generating means for generating pseudo random codes of M sequence at initial phases different from one another, and is configured to collect outputs at predetermined stages of said respective pseudo random means to output an m-bit parallel white noise signal.